

and indigestible seeds. Italian analyses show the pods to contain over 40 per cent of sugar and some 8 per cent of protein. Over 75 per cent of the total weight is digestible.

Carobs may be grown from seed, but improved varieties are best propagated by grafting or budding. This is best done in spring, but dormant buds may be made in autumn. The trees are difficult to transplant, and it is usually best to raise seedlings and graft them where the tree is to stand. The beans should be soaked for four days before sowing, and are best planted from 20 to 45 feet apart. If not sown in position, they had best be potted at the end of the first year, and ultimately the pots can be set where desired without danger of loss. If planted on a hillside, it is usually necessary to build a rampart of stones in the shape of a crescent in the lower side of the hill, to prevent them from being washed away.

In Italy it is claimed best to allow the plants to attain a strong growth before attempting to graft them, this being done usually in the third year from seed. The carob bears the staminate and pistillate flowers on different trees, and it is necessary in order to insure a crop of pods to have a considerable proportion of staminate trees in the plantation. Another method of securing fertilization of the flowers is to graft branches of the male tree in the ordinary carob. The trees begin to produce three years after being grafted, and in six years should produce from about 100 pounds of pods to the tree. When in full bearing each tree produces from 400 to 600 pounds. The unusually large trees may reach a height of 60 feet, having a crown 75 feet in diameter, and may produce as high as 3,000 pounds of pods. The great carob-growing regions of the Old World are along the Adriatic coast of southern Italy, the island of Sicily, the southern half of Sardinia, and the island of Cypress. They are, however, produced all along the Mediterranean Sea. The single province of Syracuse exports no less than 25,000 tons annually, worth more than \$250,000, while the total production for the island of Sicily averages about 90,000 tons a year. The carob is a concentrated food for horses, milch cows, and for fattening stock. To a certain extent it replaces oats for horse feed. It must always be fed with some more bulky fodder. It has been suggested that it is very useful in some arid regions to feed along with the thornless cactus. Sirups and various sweetmeats are sometimes prepared from carob pods, and the pods are sometimes offered for sale in America, to be eaten from the hand.

Dr. Franceschi, Santa Barbara, Cal., writes that the carob tree has been introduced into southern California many years ago. He says specimens are to be seen in different places growing much more rapidly than in their native habitat, and some of them bearing very profusely. He adds that it is the first tree to get established on the lava about Vesuvius and Etna, after the American cactus *Opuntia ficus indica* has first broken the way. It should be remembered that this tree belongs to the Leguminosae, and, like the clovers, vetches, and other plants of this family, is able to draw its nitrogen largely from the air through the bacteria which grow in little tubercles on the roots. It should certainly be tested in all parts of the Southwest where the mesquite is of importance as food for cattle, since the carob belongs to the same family and produces pods containing much more digestible material." (Swingle.)

3113 to 3116. CYNARA SCOLYMUS.

Artichoke.

From France. Received through Mr. W. T. Swingle, April, 1899.

These four numbers, as well as Nos. 3118 and 3119, are some of the best varieties of artichoke grown in France. The varieties grown in America have almost, if not quite all, originated from seed. By this importation it is hoped to obtain the very best sorts now grown in Europe. A special circular giving methods of culture and other information about artichoke has been issued by this office and published as No. 22 of the Division of Botany.

3113. *Large green Paris artichoke.* (*Gros vert de Laon.*) This variety is one of the most extensively cultivated in the neighborhood of Paris. It yields regularly and abundantly and has larger heads than any other variety. It has the great advantage of reproducing itself from seed. The scaly leaves composing the head are reflexed, forming an open burr looking very different from the smooth "green lobe" commonly grown in England and America.

3114. *Green Provence.* This variety, which is extensively grown in the south of France, is particularly esteemed for eating raw with pepper sauce. If grown from seed this variety always yields a large number of spiny plants. (Vilmorin.)